



Seminar and Roundtable on Coalbed Methane Development and Potential



INDIA

September 10, 1998

Country Fact Sheet

Current CBM Activities

- Advanced Resources Inc. Estimates in Damodar Valley Basins
- India's Oil and Natural Gas Commission drilling in the Damodar Valley
- Great Eastern Energy Co. in the Raniganj coal field
- Reliance Gas Private Ltd. in eastern Raniganj basin
- GEF project
- Texaco Inc. coal seam exploration in the Cambay Basin area of Gujarat
- Mckenzie Methane

Key Factors in Energy Economy

- India is the world's 3rd largest coal producer. More than half of India's energy requirements is supplied by domestic coal. Of that, coal supports approximately 70% of the power generation. Coal production = 311 million short tons, coal consumption = 321 million short tons, net coal imports 10 million short tons (1996).
- India ranks 5th in proven coal reserves with nearly 70 billion tons.
- Oil accounts for 30% of India's total energy consumption.

Potential Role of CBM in Energy Economy

- Given that there are large coal resources in India, CBM could play a substantial role in future activities.
- Coalbed methane could cut India's energy deficit and surging demand for imported natural gas.

CBM Potential

- Estimated resource base is between 30 tcf and 144 tcf.
 - (a) Estimates in the Damodar Valley range from 10 tcf to more than 114 tcf.
 - (b) Estimates in the Cambay Basin are about 11 tcf for coal seams between 2,000 and 5,000 ft deep.



Seminar and Roundtable on Coalbed Methane Development and Potential



INDIA

September 10, 1998

Country Fact Sheet

Existing Policies Affecting CBM Development

- A *New Petroleum Tax Code* is pending approval. It offers CBM projects infrastructure status, which allow a 5-year tax holiday from the date production commences, and a 30% concession on income tax payable in the following 5 years. The government is considering whether to extend this period for an additional 2 years. This concession reduces the 48% tax rate on foreign operating companies to 33.6% during that period. No customs duties would apply. The companies will be subject to a base rate 10% *ad valorem* royalty, payable to the respective state government. An additional production-linked payment would be payable to the central government on a sliding scale based on the production level. This payment schedule has been kept as a biddable item. A nominal commercial bonus of \$300,000 would be paid on declaration of commercial assessment.
- *1997 Guidelines for the Semiprivatization of State-Run Coal Mines.* This overhaul of the country's ailing coal mining industry offers mines to state-owned and private firms for captive consumption only.

Overseeing or Permitting Government Agencies

- Coal India Limited
- Ministry of Petroleum and Natural Gas-governmental authority for the exploitation of CBM
- Directorate General of Hydrocarbons - regulatory body responsible for preparing terms and conditions of contracts for CBM exploration and production and licensing, developing the block data packages, and maintaining oversight during the exploration and development cycle.

Potential Barriers to

- Government controls over new investments in the coal industry.



Seminar and Roundtable on Coalbed Methane Development and Potential



INDIA

September 10, 1998

Country Fact Sheet

CBM Development

However, guidelines for foreign investment (January 1997) for local consumption of power allow more investment by private and foreign companies in coal mining.

- India's Oil and Natural Gas Commission has conventional oil and gas operations throughout the region, complicating ownership issues.
- Institutional problems regarding resource ownership and modalities of payment to the nationalized companies.

Donors/ Companies/ Investors Active in CBM

Essar Oil Co., U.S. Agency for International Development Program for Acceleration of Commercial Energy Research, ARCO, Phillips Petroleum Co. Texaco Inc., Reliance Gas Private Ltd., India's Oil and Natural Gas Commission, Gas Authority of India Ltd., Advanced Resources Inc, Great Eastern Energy Co., Amoco India Petroleum Co., Enron Exploration Co., Global Environment Facility



Seminar and Roundtable on Coalbed Methane Development and Potential **INDIA PROJECT**



September 10, 1998

Country Fact Sheet

Coalbed Methane Capture and Commercial Utilization

Contact Information	UNDP
Status	Full Project
Location	Jharia and Raniganj basins in the state of Bihar, India
Technical Summary	<p>The objectives of this project are to control greenhouse gas emissions and demonstrate the economic viability of harnessing coalbed methane, an important greenhouse gas, in the Indian coal mining sector. The full project is intended to build national capacity in the field of coalbed methane recovery and utilization.</p> <p>The specific objectives are:</p> <ul style="list-style-type: none">• Strengthen and increase institutional capacity• Plan, engineer, and prepare for demonstration project• Design, drill, and produce CBM• Use the gas produced• Develop an action plan for replication of successful activities• Establish coalbed methane clearinghouse
Estimated Capital and O&M Costs	<ul style="list-style-type: none">• Total project cost US\$19 million• GEF – allocation US\$9.190 million• India government co-financing – US\$4.544 million• Indian government (in-kind) – US\$2.321 million• UNDP co-financing US\$1.214 million• Revenue – US\$1.760 million



**Seminar and Roundtable
on Coalbed Methane
Development and Potential**

INDIA PROJECT



September 10, 1998

Country Fact Sheet

Sources of Revenue

Savings enjoyed by the sample mines if the gas recovered is predominantly used for producing their own power.



**Seminar and Roundtable
on Coalbed Methane
Development and Potential**

INDIA PROJECT



September 10, 1998

Country Fact Sheet

Coalbed Methane Drilling in Northern Gujarat

Contact Information

Essar Oil Co.

Status

Pilot complete

Location

Near Mehsana, Gujarat, India

Technical Summary

Starting in 1993, this was the first CBM drilling program in India. Under the program, three wells were drilled. Two of the wells, LBM No. 1 and LBM No. 2 are about 10km apart. Both wells were completed and stimulated. The third well, LBM No. 3, was drilled as an offset to LBM No.1 as part of a planned five-well pilot project.

Based on data from these three CBM wells and several dozen well logs from the surrounding area, it can be shown that the three main coal seams are consistently thick and laterally persistent throughout the Mehsana CBM project area. In addition, the gas content values are in the range of 200 cu ft/ton, surprisingly high given the low rank of the coal.

Proponents/ Sponsors of the Project

Program for Acceleration of Commercial Energy Research,
U.S. Agency for International Development



**Seminar and Roundtable
on Coalbed Methane
Development and Potential**

INDIA PROJECT



September 10, 1998

Country Fact Sheet

Amoco India Petroleum Co. in the Damodar Valley

Contact Information

Amoco India Petroleum Co.

Status

Suspended

Location

Damodar Valley in the states of Bihar and West Bengal

Technical Summary

In 1994, Amoco India Petroleum Co. was awarded a government concession for coal seam gas evaluation in virgin coal at the Ranganj, Jharia, East Bokaro, and North Karanpura coal fields. Based on rank, thickness, and limited sorption isotherm data, Amoco India estimated coal seam gas resources of 10 to 24 Tcf and recoverable gas on the order of 1.4 Tcf in the unmined coals of these fields.

**Estimated Capital
and O&M Costs**

The project was estimated at US\$1 billion.

**Proponents/
Sponsors of the
Project**

Amoco India Petroleum Co.

Lessons Learned

In September 1996, Amoco India suspended the project because it was unable to secure a commitment from the government to fund or build a gas pipeline into the remote Damodar fields. Furthermore, a mutually satisfactory production agreement for gas sales could be realized.



**Seminar and Roundtable
on Coalbed Methane
Development and Potential**



INDIA PROJECT

September 10, 1998

Country Fact Sheet

Reliance-Texaco Inc. in the Cambay Basin

Contact Information	Texaco Inc.
Status	Pending government approval
Location	Cambay basin in northern Gujarat, India
Technical Summary	Operators estimate the field's potential productivity at 5.7 to 14 million m ³ /d.
Estimated Capital and O&M Costs	Up to US\$1 billion could be invested over the next 8 years.
Proponents/ Sponsors of the Project	Reliance Industries Ltd.